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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/976,200	10/11/2001	Nir Binshtok	884.557US1	1429
21186	7590	04/05/2005	EXAMINER	
SCHWEGMAN, LUNDBERG, WOESSNER & KLUTH, P.A.			BAYARD, EMMANUEL	
P.O. BOX 2938			ART UNIT	
MINNEAPOLIS, MN 55402			PAPER NUMBER	

2631

DATE MAILED: 04/05/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/976,200

Applicant(s)

BINSHTOK ET AL.

Examiner

Emmanuel Bayard

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 04 February 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-29 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-29 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

This is in response to RCE filed on 2/4/05 in which claims 1-29 are pending.

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1-29 are rejected under 35 U.S.C. 102(e) as being anticipated by Hiramatsu U.S. patent No 6,600,935 B1.

As per claims 1, 10 and 23, Hiramatsu teaches a method for reducing interference in a communication device comprising: providing a communication device having first and second antenna elements (see figs. 2, 5-6 elements 116-117, 420-421) and a radio frequency combiner (see figs. 2, 5-6 elements 119, 423 and col.5, lines 17-35 and col.7, lines 45-55) to combine outputs of said first and second antenna elements, said first antenna element having an adjustable weight (see col.6, lines 4-10 and col.8, lines 30-35 and col.9, lines 50-60); said communication device further having a single radio frequency receiver path to receive the combined outputs and produce a base band communication (see figs. 2, 5-6 elements 120, 424 and col.5, lines 35-40 and col.9, lines 8-15); a correction value circuit to adjust or compare the phase and

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amplitude difference of the respective antennas is the same as the (channel determining individual channel responses) (see figs.2, 5-6 elements 121, 426 and col.5, lines 55-65 and col.7, lines 55-57 and col.9, lines 18-45) for said first and second antenna elements for each of a plurality of base stations of interest at the base band communication signal; and determining a weight for said first antenna element that optimizes an interference-related quality criterion based on said individual channel responses (see col.6, lines 4-10 and col.8, lines 30-35 and col.9, lines 48-60) using phased array principles to direct a receive beam.

As per claim 2, Hiramatsu does teach said communication device includes more than two antenna elements (see figs. 2, 5-6), wherein said combiner combines the outputs of said more than two antenna elements.

As per claim 3, Hiramatsu does teach determining individual channel responses includes: applying a predetermined weight (see col.6, lines 4-10 and col.8, lines 30-35 and col.9, lines 48-60) to said first antenna element; estimating a combined channel response (see figs.2, 5-6 elements 121, 426 and col.5, lines 55-65 and col.7, lines 55-57 and col.9, lines 18-45) for a channel between a first base station of interest and an output of said combiner while said predetermined weight is being applied; and calculating an individual channel response for a channel between said first base station of interest and said first antenna element using said estimated combined channel response (see figs.2, 5-6 elements 121, 426 and col.5, lines 55-65 and col.7, lines 55-57 and col.9, lines 18-45).

As per claim 4, Hiramatsu does teach calculating an individual channel response includes determining a weight previously applied to said first antenna element and using said previously applied weight to calculate said individual channel response (see col.6, lines 4-10 and col.8, lines 30-35 and col.9, lines 48-60).

As per claim 5, Hiramatsu inherently teaches: said weight is a complex weight having a magnitude-related component and a phase-related component.

As per claims 6, 14, 21 Hiramatsu inherently teaches said interference-related quality criterion includes a signal to interference and noise ratio (SINR)

As per claim 7, Hiramatsu inherently teaches said interference-related quality criterion includes a bit error rate (BER).

As per claim 8, Hiramatsu inherently teaches said interference-related quality criterion includes a mean square error (MSE).

As per claim 9, Hiramatsu inherently teaches determining a weight includes switching is the same as the claimed (selecting) (see col.6, lines 41-42 and col.9, lines 58-60) a weight from a predefined set of possible weights.

As per claim 11, 16, Hiramatsu does teach repeating estimating a combined channel response and calculating individual channel responses for each of a plurality of base stations of interest (see figs 2, 5-6 and feedback).

As per claim 12, Hiramatsu inherently teaches estimating a combined channel response includes identifying and using a pilot signal received from said first base station of interest.

As per claim 13, Hiramatsu inherently teaches applying a predetermined weight includes forcing a magnitude associated with said first antenna element to zero.

As per claims 17, 18, Hiramatsu inherently teaches calculating individual channel responses include using antenna weight information from a previous time period.

As per claim 19, Hiramatsu inherently teaches calculating individual channel responses includes solving M equations in M unknowns, where M is an integer greater than 1.

As per claim 20, Hiramatsu inherently teaches calculating individual channel responses includes solving the following system of equations for $C1(t=nT)$: $h_1(t) = WC$, $(t) \in [nT, nT + 1]$ $h_1(t) = W(n)TC$, $(t) \in [(n-1)T + 1, nT)$ where $h_1(t)$ is the estimated combined channel response for the first base station of interest at time t , $W((n-1)T)$ is the calculated vector gain of the antenna elements during previous period $[(n-1)T + 1, nT)$, $C1(t)$ is the matrix channel response of the first base station of interest for each of the antenna elements at time t , and W is the vector gain of the antennas using the predetermined weight.

As per claim 22, Hiramatsu inherently teaches repeating applying a predetermined weight, estimating a combined channel response, calculating individual channel responses, determining a new weight, and applying said new weight for a subsequent time period.

As per claim 24, Hiramatsu does teach at least one additional antenna element (see figs.2, 5-6 elements 118, 422), wherein said combiner combines outputs

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of said first antenna element, said second antenna element, and said at least one additional antenna element to generate said combined signal and wherein said first unit determines individual channel responses for said first antenna element, said second antenna element, and said at least one additional antenna element for each of the base stations of interest.

As per claim 25, Hiramatsu teaches said controller (see col.4, lines 25-30) repeatedly updates said weight of said first antenna element..

As per claim 26, Hiramatsu inherently teaches said controller updates said weight of said first antenna element at intervals that depend upon a Doppler rate associated with said communication device.

As per claim 27, Hiramatsu inherently teaches interference-related quality criterion includes a signal to interference and noise ratio (SINR).

As per claim 28, Hiramatsu inherently teaches first unit regularly applies a predetermined weight to said first antenna element for use in determining said individual channel responses.

As per claim 29, Hiramatsu inherently teaches said first unit determines said individual channel responses for said first and second antenna elements using a combined channel response for said first and second antenna elements for each base station of interest.

Conclusion

3. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Rauhala et al U.S. Patent NO 6,847,803 B1 teaches method for reducing interference.

Vook et al U.S. Patent No 6,765,969 B1 teaches a method and device for multi-user channel estimation.

Kuwahara et al U.S. patent No 6,647,276 B1 teaches an antenna unit.

Ling et al U.S. Patent No 6,172,970 B1 teaches a low-complexity antenna (*).

Halford et al U.S. patent No 6,754,511 B1 teaches a linear signal (*).

Kobayakawa et al U.S. patent No 6,058,318 teaches a radio base station (*).

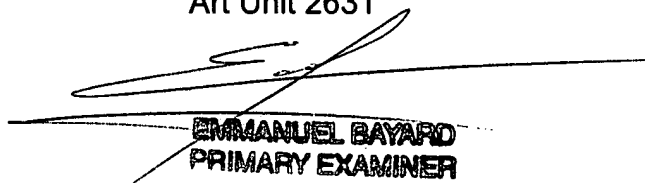
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Emmanuel Bayard whose telephone number is 571 272 3016. The examiner can normally be reached on Monday-Friday (7:Am-4:30PM) Alternate Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mohammed Ghayour can be reached on 571 272 3021. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Emmanuel Bayard
Primary Examiner
Art Unit 2631

4/2/05



EMMANUEL BAYARD
PRIMARY EXAMINER